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FOREST INSECT INVESTIGATIONS

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FOREST INSECT SURVEY
MODOC NATIONAL FOREST, CALIFORNIA, AND ADJACENT PRIVATE LANDS
SEASON OF 1945

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SEASON OF 1945

FIELD EXAMINATION.

Personnel: John E. Patterson and Philip C. Johnson, Forest Insect Laboratory, Bureau of Entomology and Plant Quarantine, Berkeley, California

Date: October 18-24, 1945, inclusive

Methods: Sample plots and reconnaissance.

AREAS EXAMINED.

Modoc National Forest and adjacent private timberlands, subdivided into entomological reporting areas and units as shown on the attached map.

IMPORTANT FOREST INSECT PROBLEMS REVEALED BY THE SURVEY.

The drain of pine timber resources from infestations of bark beetles constitutes the only current insect problem of importance. It exists in all parts of the Forest, chiefly in virgin stands and to a lesser degree in cutover reserve stands.

INSECTS RESPONSIBLE FOR PINE DAMAGE IN 1944 AND 1945.

Western pine beetle, Dendroctonus brevicomis Lec., in ponderosa pine associated in some instances by a top-killing engraver beetle, Ips oregoni Eich.; Jeffrey pine beetle, D. jeffreyi Hopk., in Jeffrey pine.

CHARACTER OF 1944 AND 1945 BARK BEETLE INFESTATIONS.

The 1944 pine beetle infestation proved to be decidedly endemic everywhere in the Forest except in a few local areas already described in the survey report of last year 1/. The infested trees were thinly scattered through the stands. In the mature stands they were comprised of the mature to overmature decadent trees, a large percentage of which were of high insect risk.

1/ Johnson, Philip C. Forest insect survey, Modoc National Forest and adjacent private lands, season of 1944. Forest Insect Laboratory, Berkeley, California. February 12, 1945

The 1945 infestation, likewise, was endemic, perhaps to a slightly lesser degree than in 1944, and with the same general characteristics as described above. Lightning during the summer of 1945, however, was intensive enough at times in parts of the Forest to have resulted in an unusually large number of struck trees which were subsequently attacked by bark beetles. Many of these were insect-resistant dominant trees which otherwise might not have been attacked. Lightning-struck trees, subsequently attacked, made up 22 percent of the 1945-infested trees in the Weed Valley Unit (Devils Garden Area), 33 1/3 percent in the virgin stands of the Happy Camp Unit (Happy Camp-Lava Beds Area), and 17 percent in the Hog Lake section of the same unit where a light sanitation-salvage cutting had been employed in 1942 to reduce the insect hazard of the stand.

TREND OF BARK BEETLE INFESTATIONS.

The intensity of the 1944 bark beetle infestations was less than in 1943 (Figure 1), thus continuing the trend of declining infestations which began in 1935. Incomplete records of the 1945 infestations obtained by the survey indicate that this trend will be interrupted by an infestation of increasing intensity.

INSECT DAMAGE ON SAMPLE PLOTS IN 1944.

Pine bark beetles were responsible for practically all the damage which occurred on the sample plots during 1944. The number of trees, the board-foot volume and the percentage of the pine stand killed by these insects are shown in Table 1. The following recapitulation shows the average volume and percent of the pine stand killed per acre:

Reporting Area	Ponderosa Pine		Sugar Pine		Jeffrey Pine	
	b.m.	%	b.m.	%	b.m.	%
Happy Camp-Lava Beds (9 plots)	25.2	0.3	none	none		
Devils Garden (9 plots)	13.2	0.1				
Warner Mountains (no plots)						
Adin (5 plots)	1.8	0.1-			none	none
Big Valley Mountain (1 plot)	31.8	0.1	none	none	none	none
Modoc National Forest (24 plots)	18.5	0.2	none	none	none	none

The plots were indicative of several facts gleaned from a general reconnaissance of the Forest: (1) damage from the western pine beetle was variable and apparently more or less concentrated in the better timber-growing sites and (2) perceivable damage from the Jeffrey pine beetle was inexplainably absent in areas where Jeffrey pine occurred in abundance.

ESTIMATED 1944 BARK BEETLE DAMAGE IN VIRGIN PINE STANDS.

A total of nearly 7,000 trees above 12 inches D.B.H., containing a volume of 8,000,000 board feet, were killed by pine bark beetles in 1944. This amount represents approximately 0.2 percent of the present pine stands.

Distribution of these losses by entomological areas and units is shown in Table 2.

BARK BEETLE DAMAGE IN 1945.

Complete records of the damage from 1945 attacks of bark beetles were unobtainable when the survey was made and no attempt has been made to make quantitative estimates of the damage incurred on the units or areas. While the current infestations as a whole appear to be endemic, such measurements as were obtainable from the plots indicate that the 1945 beetle losses will be more than they were in 1944 for the Forest, particularly in some reporting areas. Increased insect activity in 1945 was most noticeable in the Ash Creek and Willow Creek Units of the Adin Area, the Badger Unit of the Happy Camp-Lava Beds Area and in the fringe-type timber in and adjacent to the Quinn Indian allotment[1/] near the lower end of Widow Valley (Widow Valley Unit, Big Valley Mountain Area). While the quantitative losses in these specific localities are still endemic, the abrupt change in infestation trend will bear watching. Both the Forest Service and the McCloud River Lumber Company contemplate cutting operations in these areas in the near future and these may be carried out before too much beetle damage accrues.

CURRENT BARK BEETLE DAMAGE IN CUTOVER RESERVE STANDS.

Brief examination of most cutover areas was made by the survey and no serious insect problems were observed. The post-logging flare-up of beetle activity in the reserve stands of the Long Bell Lava Beds sale area[2/] continued to decline in 1944 and is no longer a serious problem. The cutover reserve stand in the vicinity of Roney Flat (Rush Creek and Stone Coal Units, Adin Area), however, has suffered beetle-caused losses since 1943 approximating those in nearby virgin stands. An 80-acre plot (RD-8) in the center of this cutting area shows the following average annual board-foot pine loss per acre:

1941	7.0 board feet
1942	3.1 board feet
1943	23.7 board feet
1944	17.7 board feet
1945	28.0 board feet*

(*) Actually measured by the survey; estimated to be about 75 percent of full 1945 loss.

The gradual return to normal infestation conditions is believed to be due to the wearing out of the "bug-proofing" effect secured by the 1938 sanitation-salvage type cutting. This seemed inevitable for the reason that the cutting was made in an area where natural insect hazards were great. Then, too, the

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1/ Correspondence, R. C. Hall, Forest Insect Laboratory, Berkeley, to W. B. McMillan, Office of Indian Affairs, Sacramento. September 14, 1945.

2/ Johnson, Philip C. Forest insect survey, Modoc National Forest and adjacent private lands, season of 1944. Forest Insect Laboratory, Berkeley, California. February 12, 1945

cutting was among the first attempts to regulate insect-caused damage by silvicultural methods and the marking was perhaps not as effective as the present marking standards based upon considerably more research and experience.

Insect-caused losses in the 1942 R. L. Smith Lumber Company sale area near Hog Lake have been exceedingly light through 1944 and probably would have continued to be light in 1945 had not the presence of some fire-scorched trees and a considerable number of lightning-struck trees encouraged increased insect attacks. This is evidenced by the 1945 losses measured on three plots (total, 424 acres) in the cutting area. These averaged 19.6 board feet per acre, 16.4 board feet of which were contained in infested trees previously fire-scorched or lightning-struck.

INSECT CONTROL RECOMMENDATIONS.

No direct control measures seem warranted at this time. The current cutting policy of the Modoc National Forest is very commendable from the standpoint of reducing beetle hazard and it is hoped that this method of cutting can be extended over relatively large sections of the Forest while the infestation rate is low. The currently aggressive infestation in the Widow Valley Unit, described above, is a threat to the more valuable timber in the upper end of the valley and should be curbed by some control measures if the fringe stand supporting it cannot be included in the 1946 cutting program of the McCloud River Lumber Company or some other operator. The Ash Creek and Willow Creek Units should be given prior consideration in the cutting plans of the Forest Service if infestations now developing are to be curbed before they develop too far.

Table 1. Pine timber killed by bark beetles on virgin sample plots in 1944. Modoc National Forest, California, and adjacent private lands.

ENTOMOLOGICAL UNIT	SAMPLE PLOTS NO.	TIMBERED ACREAGE	HAZARD RATING	PINE STAND TREE SPP.	VOLUME M b.m.	TIMBER KILLED IN 1944 NO. OF TREES	VOLUME (b.m.)	VOLUME PER ACRE	% OF STAND
HAPPY CAMP - LAVA BEDS AREA									
Badger	MC-6	320	IV	PP	3,590	2	2,050	6.4	0.1
	MC-7	300	V	PP	2,490	2	2,420	8.1	0.1
	RD-1	160	V	PP	1,550	2	1,310	8.2	0.1
	RD-2	160	IV-V	PP	820	1	900	5.6	0.1
	RD-37	160	V	PP	760	5	5,740	35.9	0.8
Happy Camp	RD-10	160	IV-V	PP	1,850	3	3,270	20.5	0.2
	RD-38	160	IV	PP	1,790	13	12,560	78.5	0.7
Glass Mtn.	RD-40	160	III	PP	2,940	4	11,060	89.5	0.4
				SP	910	none	none	none	none
				Total	3,850	4	11,060	89.5	0.3
Timber Mtn.	RD-39	160	V	PP	360	1	1,650	10.4	0.5
				PP				25.2	0.3
	AVERAGE OF REPORTING AREA			SP				none	none
				Total				25.2	0.3
DEVILS GARDEN AREA									
Weed Valley	RD-24	160	IV	PP	1,750	1	80	0.5	0.1-
	RD-25	160	III	PP	1,970	2	1,000	6.3	0.1
	RD-27	160	IV	PP	1,430	7	7,600	47.5	0.5
Fletcher Creek	RD-28	160	III	PP	2,790	1	2,820	17.6	0.1
	RD-29	160	III	PP	3,550	none	none	none	none
	RD-30	160	IV	PP	1,580	none	none	none	none
	RD-34	160	IV	PP	2,040	1	1,210	7.6	0.1
Blue Mtn.	RD-26	160	IV	PP	1,710	3	5,150	32.2	0.3
	RD-32	80	IV	PP	480	1	40	0.5	0.1-
	AVERAGING OF REPORTING AREA			PP				13.2	0.1
ADIN AREA									
Sweagert Flat	RD-36	80	III	PP	280	none	none	none	none
				JP	660	none	none	none	none
				Total	940	none	none	none	none
Ash Creek	RD-15	80	IV	PP	380	none	none	none	none
				JP	130	none	none	none	none
				Total	510	none	none	none	none
Willow Creek	RD-16	80	IV	PP	880	1	40	0.5	0.1-
				JP	330	none	none	none	none
				Total	1,210	1	40	0.5	0.1-
	RD-17	160	IV	PP	490	none	none	none	none
				JP	780	none	none	none	none
				Total	1,270	none	none	none	none
Boyd Spring	RD-19	160	IV	PP	1,790	1	950	5.9	0.1
				JP	360	none	none	none	none
				Total	2,150	1	950	5.9	0.1
	AVERAGE OF REPORTING AREA			PP				1.8	0.1-
				JP				none	none
				Total				1.8	0.1-
BIG VALLEY MOUNTAIN AREA									
Widow Valley	RD-14	160	III	PP	2,320	3	5,080	31.8	0.2
				SP	1,480	none	none	none	none
				Total	3,800	3	5,080	31.8	0.1
MODOC NAT'L FOREST AND ADJACENT PRIVATE TIMBERLANDS									
				PP 1/				18.5	0.2
	AVERAGE OF ALL REPORTING AREAS			JP 2/				none	none
				SP 3/				none	none

1/ Average of all plots. 2/ Average of plots in Adin Area. 3/ Big Valley Mountain area only.

Table 2. Estimated virgin pine timber killed in 1944 by bark beetles. Modoc National Forest, California, and adjacent private lands.

ENTOMOLOGICAL UNITS	PINE TYPE ACREAGE (January 1, 1945) Virgin	Cutover	Total	VIRGIN PINE STAND Spp.	M b.m.	PINE TIMBER KILLED 1944 NO. OF TREES	VOLUME M b.m.	b.m./ac.	% stand
HAPPY CAMP - LAVA BEDS AREA									
Badger	46,370	9,930	56,300	PP	313,770	460	450	9.8	0.1
Happy Camp	41,990	15,050	57,040	PP	408,000	1,300	1,350	32.1	0.3
Webb Butte	21,820	43,310	65,130	PP	308,300	610	920	42.0	0.3
Lava Beds	26,840	29,180	56,020	PP	261,430	1,020	520	19.2	0.2
Glass Mtn.	18,130	40,960	59,090	PP	212,100	270	810	44.8	0.4
				SP	37,620	none	none	none	none
Timber Mtn.	27,290	21,740	49,030	PP	60,720	160	280	10.4	0.5
AREA TOTALS	182,440	160,170	342,610	PP	1,564,320	3,820	4,330	23.7	0.3
				SP	37,620	none	none	none	none
DEVILS GARDEN AREA									
Weed Valley	24,780	-	24,780	PP	260,990	270	450	18.3	0.2
Fletcher Creek	55,510	1,930	57,440	PP	710,730	330	700	12.6	0.1
Blue Mtn.	13,130	-	13,130	PP	147,390	210	220	16.4	0.1
AREA TOTALS	93,420	1,930	95,350	PP	1,119,110	810	1,370	14.7	0.1
ADIN AREA									
Dutch Flat	7,430	6,650	14,080	PP	55,670	60	60	8.1	0.1
				JP	15,390	10	10	1.3	0.1-
Stone Coal	18,110	2,830	20,940	PP	102,230	100	100	5.5	0.1
				JP	32,960	30	20	1.1	0.1-
Toms Creek	10,510	18,670	29,180	PP	118,650	120	120	11.4	0.1
				JP	29,560	10	10	1.0	0.1-
Likely	13,970	12,880	26,850	PP	184,530	180	180	12.9	0.1
				JP	60,150	30	20	1.4	0.1-
Rush Creek	12,690	5,560	18,250	PP	12,360	10	10	0.8	0.1-
				JP	42,490	30	20	1.6	0.1-
Sweagert Flat	11,630	1,840	13,470	PP	88,250	90	90	7.7	0.1
				JP	49,380	30	20	1.7	0.1-
Ash Creek	18,710	160	18,870	PP	78,150	80	80	4.3	1.0
				JP	61,370	40	30	1.6	0.1-
Willow Creek	32,460	-	32,460	PP	101,660	100	100	3.1	0.1
				JP	143,730	90	70	2.2	0.1-
Boyd Spring	17,920	2,760	20,680	PP	94,840	90	90	5.0	0.1
				JP	59,690	40	30	1.7	0.1-
Juniper Creek	13,860	680	14,540	PP	99,530	100	100	7.2	0.1
				JP	18,130	10	10	0.7	0.1-
AREA TOTALS	164,740	44,580	209,320	PP	935,870	930	930	5.6	0.1
				JP	512,850	320	240	1.5	0.1-
BIG VALLEY MOUNTAIN AREA									
White Horse	7,820	43,010	50,830	PP	103,720	110	190	23.9	0.2
				SP	55,610	none	none	none	none
Widow Valley	15,710	16,830	32,540	PP	195,480	300	500	31.8	0.3
				SP	69,210	20	50	3.2	0.1
Muck Valley	3,540	8,030	11,570	PP	5,110	30	20	5.1	0.1
				JP	1,370	none	none	none	none
AREA TOTALS	27,070	67,870	94,940	PP	304,310	440	710	26.2	0.2
				SP	124,820	20	50	1.8	0.1-
				JP	1,370	none	none	none	none
WARNER MOUNTAINS AREA									
Bidwell Creek	4,090	1,270	5,360	PP	28,440	30	30	7.3	0.1
Joseph Creek	1,940	1,600	3,540	PP	17,030	20	20	10.3	0.1
Parker Creek	8,550	1,330	9,880	PP	83,030	40	40	4.7	0.1-
				JP	20,580	20	20	2.3	0.1
Cantrall Mill	13,620	1,600	15,220	PP	47,550	20	20	1.5	0.1-
				JP	85,960	200	170	12.5	0.2
Long Valley	11,960	1,260	13,220	PP	105,000	110	110	9.2	0.1
				JP	34,630	40	30	2.5	0.1
AREA TOTALS	40,160	7,060	47,220	PP	281,050	220	220	5.5	0.1
				JP	141,170	260	220	5.5	0.2
MODOC NATIONAL FOREST AND ADJACENT PRIVATE LANDS									
Total of above five reporting areas	507,830	281,610	789,440	PP	4,204,660	6,220	7,560	14.9	0.2
				SP	162,440	20	50	0.1	0.1-
				JP	655,390	580	460	0.9	0.1
				PP+SP+JP	5,022,490	6,820	8,070	15.9	0.2